CLAIMS:

1. A peptide having the amino acid sequence

X01-X02-X03-G-X04-X05-X06-X07-X08-X09-W-X10-X11-X12

wherein

X01 = amino group, acetyl group, biotin group, fluorescent label, spacer, linker or deletion;

X02 = D,G,E,T, S or deletion;

X03 = W,Y,F,G,T;

X04 = T,S,A,G;

X05 = L,F,Y,W;

X06 = V,I,W,F,Y;

X07 = S,A,C;

X08 = G,D,E,N,Q;

X09 = F,L,I,Y;

X10 = E,Q,T,S,L;

X11 = Y,F,T,S,W;

X12 = amide, the free acid, GKK, or a spacer;

and peptides having the amino acid sequence

X01-X02-W-X03-R-X04-X05-X06-X07-X08-E-A-R-X09-X10-X11-X12-X13-X14-X15-X16-X17

wherein

X01 = amino group, amino acid, peptide, acetyl group, biotin group, fluorescent label, spacer, linker or deletion;

X02 = H, E, Q;

X03 = H, F, Y, W;

X04 = A, V;

X05 = G, T, E, S, D, N;

X06 = S, H, A;

X07 = D, N ,Q, E;

X08 = G, A, or a deletion;

X09 = D, N, R;

X10 = S, T, C, M;

X11 = H F, W, Y;

X12 = A, D, N, S;

X13 = D, N;

X14 = E, P;

X15 = R, K, T;

X16 = S, T, C, M or a deletion;

X17 = amide, the free acid, GKK, SGKK or a spacer.

2. The peptide according to claim 1 having the following amino acid sequence:

X01-X02-X03-G-X04-X05-X06-X07-X08-X09-W-X10-X11-X12

wherein

X01 = amino group, acetyl group, biotin group, fluorescent label, spacer, linker or deletion;

X02 = D,E,T, or deletion;

X03 = W,Y,T;

X04 = T,S;

X05 = L,F;

X06 = V,F;

X07 = S;

X08 = G,D,E;

X09 = F,L;

X10 = E,Q,T,L;

X11 = Y,T,S;

X12 = amid, the free acid, GKK, or a spacer;

and peptides having the amino acid sequence

X01-H-W-X03-R-A-X05-S-D-X08-E-A-R-R-S-Y-X12-D-P-X15-X16-X17

wherein

X01 = amino group, amino acid, peptide, acetyl group, biotin group, fluorescent label, spacer, linker or deletion;

X03 = Y, W;

X05 = T, E;

X08 = G, or a deletion;

X12 = A, N;

X15 = K, T;

X16 = S, or a deletion;

X17 = amide, the free acid, GKK, SGKK or a spacer.

3. The peptides according to any of claims 1 or 2 selected from the group consisting of:

-TGSFFSELWTSR^2,
EYGSFFSELWTSR^2,
TYGTLFSDFWLSR^2,

DWGTLVSGFWEYR^2,
DWGTLFSDFWQTR^2,

wherein R^2 is an acid amide, a free acid or GKKR^3, and wherein R^3 is an acid amide or a free acid;

with the proviso that a maximum of one non-conservative amino acid exchange is effected per amino acid position in the sequence, wherein "non-conservative exchange" means an exchange of amino acids between the groups mentioned below:

Group I: Leu, Ile, Val, Met, His, Trp, Tyr, Phe,

Group II: Glu, Gln, Asp, Asn,

Group III: Ser, Thr, Cys, Gly, Ala, Pro,

Group IV: Lys, Arg;

and

peptides selected from the group consisting of:

HWWRAESD-EARRSYNDPK-R^2,
HWYRATSDGEARRSYADPTSR^2,

with the proviso that a maximum of two non-conservative amino acid exchanges are effected per amino acid position in the sequence, wherein "non-conservative exchange" means an exchange of amino acids between the groups mentioned below:

Group I: Leu, Ile, Val, Met, His, Trp, Tyr, Phe,

Group II: Glu, Gln, Asp, Asn,

Group III: Ser, Thr, Cys, Gly, Ala, Pro,

Group IV: Lys, Arg.

4. The peptides according to claims 1 to 3, characterized by being:

TGSFF SELWT SGKK-amide or free acid,

E YGSFF SELWT SGKK-amide or free acid,

T YGTLF SDFWL SGKK-amide or free acid,

His-Trp-Trp-Arg-Ala-Glu-Ser-Asp-Glu-Ala-Arg-Arg-Ser-Tyr-Asn-Asp-Pro-Lys-amide or free acid,

Ala-Arg-Arg-Cys-Tyr-Asn-Asp-Pro-Lys-amide or free acid,

D WGTLV SGFWE Y amide or free acid,

D WGTLF SDFWQ TGKK amide or free acid,

H WYRAT SDGEA RRSYA DPTSG KK-amide or free acid,

HWWRAESDEARRSYNDPKC-amide or free acid,

which may also be acetylated N-terminally.

5. The peptides according to claims 1 to 4, characterized by being bound by antibodies of patients suffering from dilatative cardiomyopathy.

6. The peptides according to any of claims 1 to 5, characterized in that said linker is selected from the group consisting of:

- α-aminocarboxylic acids and their homo- and heterooligomers;
- α,ω-aminocarboxylic acids and their branched homo- or heterooligomers;
- other amino acids and their linear and branched homo- or heterooligomers (peptides);
- amino-oligoalkoxy-alkylamines;
- maleinimidocarboxylic acid derivatives;
- oligomers of alkylamines;
- 4-alkylphenyl derivatives;
- 4-oligoalkoxyphenyl or 4–oligoalkoxyphenoxy derivatives;
- 4-oligoalkylmercaptophenyl or 4–oligoalkylmercaptophenoxy derivatives;

- 4-oligoalkylaminophenyl or 4–oligoalkylaminophenoxy derivatives;
- (oligoalkylbenzyl)phenyl or (4–oligoalkylbenzyl)phenoxy derivatives, and (4–oligoalkoxybenzyl)phenyl or (4–oligoalkoxybenzyl)phenoxy derivatives;
- trityl derivatives;
- benzyloxyaryl or benzyloxyalkyl derivatives;
- xanthene-3-yloxyalkyl derivatives;
- (4-alkylphenyl) or ω-(4-alkylphenoxy)alkanoic acid derivatives;
- oligoalkylphenoxyalkyl or oligoalkoxyphenoxyalkyl derivatives;
- carbamate derivatives;
- amines;
- trialkylsilyl or dialkylalkoxysilyl derivatives;
- alkyl or aryl derivatives;
- and combinations thereof.

7. The peptides according to any of claims 1 to 6, characterized by being bound to a solid phase.

8. The peptides according to any of claims 1 to 7, characterized by being bound to a solid phase through a spacer.

9. A medicament containing the peptides according to any of claims 1 to 8.

10. Use of the peptides according to any of claims 1 to 8 for the preparation of a medicament for treatment with diseases related to β_1-adrenergically active auto-antibodies, especially dilatative cardiomyopathy.

11. A method for treating diseases related to β_1-adrenergically active auto-antibodies by removing the auto-antibodies by means of peptides according to claim 6 or 7 bound to a solid phase.

12. A device for chromatography containing peptides according to claim 6 or 7 bound to a solid phase.